

ABSTRACT OF THE DISCLOSURE

09 | 690580

An ESD protection structure for use with bipolar or BiCMOS ICs that is relatively immune to thermal overheating and, thus, stable during an ESD event.

5 This immunity is achieved by employing a heat sink region adjacent to a polysilicon emitter within a distance of less than 2 microns. Such a heat sink region provides temporal heat capacity to locally dissipate the heat generated during an ESD event. Bipolar transistor-based ESD protection structures according to the present invention include a semiconductor substrate and a

10 bipolar transistor in and on the semiconductor. The bipolar transistor includes a base region, a collection region and a polysilicon emitter. The bipolar transistor-based ESD protection structures also include a heat sink region disposed above the semiconductor substrate adjacent to the polysilicon emitter. The heat sink region is formed of a material with a heat capacity and/or thermal conductivity that is greater than the heat capacity and/or thermal conductivity of the material (typically an SiO₂-based material) which conventionally covers the ESD protection structures. The heat sink region can be formed, for example, of metal and/or polysilicon. In one embodiment, the heat sink region is floating and disposed adjacent to the polysilicon. In another embodiment, the heat sink

15 region is integrated with a metal contact to the polysilicon emitter, thereby making the otherwise conventional metal contact bulkier. By locally providing extra heat capacity (i.e., a floating heat sink region or a bulky metal contact), heat is dissipated during an ESD event, thereby increasing ESD protection capability and reliability.

20